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Southern Nuclear Operating Company
Vogtle Electric Generating Plant Unit 4
ITAAC Closure Notification on Completion of Item 2.3.06.09b.ii [Index Number 375]

Ladies and Gentlemen:

In accordance with 10 CFR 52.99(c)(1), the purpose of this letter is to notify the Nuclear Regulatory Commission (NRC) of the completion of Vogtle Electric Generating Plant (VEGP) Unit 4 Inspections Tests Analyses and Acceptance Criteria (ITAAC) Item 2.3.06.09b.ii [Index Number 375] to verify that the Normal Residual Heat Removal System (RNS) provides heat removal from the reactor coolant during shutdown operations, provides low pressure makeup flow from the cask loading pit to the RCS for scenarios following actuation of the ADS, and provides heat removal from the in-containment refueling water storage tank (IRWST). This ITAAC also verifies the Motor Operated Valves (MOVs) and check valves perform their safety-related function. The closure process for this ITAAC is based on the guidance described in NEI 08-01, “Industry Guideline for the ITAAC Closure Process under 10 CFR Part 52”, which is endorsed by the NRC in Regulatory Guide 1.215.

This letter contains no new NRC regulatory commitments. Southern Nuclear Operating Company (SNC) requests NRC staff confirmation of this determination and publication of the required notice in the Federal Register per 10 CFR 52.99.

If there are any questions, please contact Kelli Roberts at 706-848-6991.

Respectfully submitted,

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Regulatory Affairs Director Vogtle 3 & 4

Enclosure: Vogtle Electric Generating Plant (VEGP) Unit 4
Completion of ITAAC 2.3.06.09b.ii [Index Number 375

JMC/TL/sfr

cc: Regional Administrator, Region II
Director, Office of Nuclear Reactor Regulation (NRR)
Director, Vogtle Project Office NRR
Senior Resident Inspector – Vogtle 3 & 4

Southern Nuclear Operating Company
ND-23-0386
Enclosure

Vogtle Electric Generating Plant (VEGP) Unit 4
Completion of ITAAC 2.3.06.09b.ii [Index Number 375]

ITAAC Statement

Design Commitment

9.b) The RNS provides heat removal from the reactor coolant during shutdown operations.

9.c) The RNS provides low pressure makeup flow from the cask loading pit to the RCS for scenarios following actuation of the ADS.

9.d) The RNS provides heat removal from the in-containment refueling water storage tank (IRWST).

12.a) The motor-operated and check valves identified in Table 2.3.6-1 perform an active safety-related function to change position as indicated in the table.

Inspections/Tests/Analyses

ii) Testing will be performed to confirm that the RNS can provide flow through the RNS heat exchangers when the pump suction is aligned to the RCS hot leg and the discharge is aligned to both PXS DVI lines with the RCS at atmospheric pressure.

iii) Inspection will be performed of the reactor coolant loop piping.

iv) Inspection will be performed of the RNS pump suction piping.

v) Inspection will be performed of the RNS pump suction nozzle connection to the RCS hot leg.

Testing will be performed to confirm that the RNS can provide low pressure makeup flow from the cask loading pit to the RCS when the pump suction is aligned to the cask loading pit and the discharge is aligned to both PXS DVI lines with RCS at atmospheric pressure.

Testing will be performed to confirm that the RNS can provide flow through the RNS heat exchangers when the pump suction is aligned to the IRWST and the discharge is aligned to the IRWST.

iii) Tests of the motor-operated valves will be performed under preoperational flow, differential pressure and temperature conditions.

iv) Exercise testing of the check valves active safety functions identified in Table 2.3.6-1 will be performed under preoperational test pressure, temperature and fluid flow conditions.

Acceptance Criteria

ii) When tested individually, each RNS pump provides at least 1400 gpm net flow to the RCS when the hot leg water level is at an elevation 15.5 inches ± 2 inches above the bottom of the hot leg.

iii) The RCS cold legs piping centerline is 17.5 inches ± 2 inches above the hot legs piping centerline.

iv) The RNS pump suction piping from the hot leg to the pump suction piping low point does not form a local high point (defined as an upward slope with a vertical rise greater than 3 inches).

v) The RNS suction line connection to the RCS is constructed from 20-inch Schedule 140 pipe.

When tested individually, each RNS pump provides at least 1100 gpm net flow to the RCS with the water level maintained within the range of > 10 ft and < 15 ft from the bottom of the cask loading pit.

Two operating RNS pumps provide at least 2000 gpm to the IRWST.

iii) Each motor-operated valve changes position as indicated in Table 2.3.6-1 under preoperational test conditions.

iv) Each check valve changes position as indicated in Table 2.3.6-1.

ITAAC Determination Basis

Multiple ITAAC are performed with inspections and tests to verify that the Normal Residual Heat Removal System (RNS) provides at least 1400 gallons per minute (gpm) net flow to the Reactor Coolant System (RCS) when the hot leg water level is at an elevation 15.5 inches ± 2 inches above the bottom of the hot leg, the RCS cold leg piping centerline is 17.5 inches ± 2 inches above the hot leg piping centerline, the RNS pump suction piping from the hot leg to the pump suction does not form a local high point, and the RNS suction line connection to the RCS is constructed from 20-inch schedule 140 pipe. This ITAAC also verifies that each RNS pump provides at least 1100 gpm net flow to the RCS when the water level is maintained within the range of > 10 ft and < 15 ft from the bottom of the cask loading pit and the two operating RNS pumps provide at least 2000 gpm to the In-containment Refueling Water Storage Tank (IRWST). This ITAAC also verifies each motor-operated valve (MOV) changes positions as indicated in Table 2.3.6-1 under preoperational test conditions and each check valve changes position as indicated in Table 2.3.6-1.

ii) When tested individually, each RNS pump provides at least 1400 gpm net flow to the RCS when the hot leg water level is at an elevation 15.5 inches ± 2 inches above the bottom of the hot leg.

Testing was performed as documented in Reference 1 to verify that each RNS pump provides at least 1400 gpm net flow to the RCS when the hot leg water level is at an elevation 15.5 inches ± 2 inches above the bottom of the hot leg.

The test was initiated by verifying the hot leg level was between 13.5 inches and 17.5 inches, the RCS was at atmospheric pressure, and temporary flow instruments and pump suction gages were installed and connected to a Data Acquisition System (DAQ). The RNS was aligned to take suction from the RCS hot leg and discharge back to the RCS Direct Vessel Injection (DVI) lines and the A RNS pump was started. The RNS flow control valves were adjusted to provide maximum flow and flow was measured and verified to meet the acceptance criteria. This testing was repeated using the B RNS pump.

The Unit 4 RNS pump A provided 2129 gpm and Unit 4 RNS pump B provided 2024 gpm. This demonstrated each RNS pump provided at least 1400 gpm net flow to the RCS when the hot leg water level was at an elevation 15.5 inches ± 2 inches above the bottom of the hot leg.

<u>iii) The RCS cold legs piping centerline is 17.5 inches ± 2 inches above the hot legs piping centerline.</u>

An inspection was performed to ensure the RCS cold leg piping centerline is 17.5 inches ± 2 inches above the hot legs piping centerline utilizing NCSP0324 “Request for Survey Support”. The survey data was taken using the guidance in the request for survey support and delivered for evaluation. The evaluation results are tabulated in Reference 2 and demonstrate that Unit 4 cold leg 1A is 17.5 inches above hot leg 1, cold leg 1B is 17.6 inches above hot leg 1, cold leg 2A is 17.3 inches above hot leg 2, and cold leg 2B is 17.4 inches above hot leg 2.

The results of the inspection confirm for Unit 4 that the RCS cold legs piping centerline is 17.5 inches ± 2 inches above the hot legs piping centerline.

<u>iv) The RNS pump suction piping from the hot leg to the pump suction piping low point does not form a local high point (defined as an upward slope with a vertical rise greater than 3 inches).</u>

An inspection was performed to ensure the RNS pump suction piping from the hot leg to the pump suction piping low point does not form a local high point. A walk down inspection of the as-built pipelines was performed for observable downward sloping sections and verifications with a digital level were taken at piping sections, where deemed necessary, to verify downward slope. The inspection found the RNS suction piping sloped downward from the RCS hot leg connection to the low point at the RNS pump suction.

The inspection results are documented in Reference 3 and confirm that Unit 4 RNS pump suction piping from the hot leg to the pump suction piping low point does not form a local high point (defined as an upward slope with a vertical rise greater than 3 inches).

<u>v) The RNS suction line connection to the RCS is constructed from 20-inch Schedule 140 pipe.</u>

An inspection of the RNS pump suction nozzle connection to the RCS hot leg was performed to verify the pipe schedule and size connection is constructed from 20-inch Schedule 140 pipe.

The inspection was performed by a review of the Certified Material Test Report (CMTR) and the work package that installed this specific piping section. The results of the inspection are contained in Reference 4 and confirm that the RNS suction line connection to the RCS was constructed from 20-inch schedule 140 pipe for Unit 4.

<u>When tested individually, each RNS pump provides at least 1100 gpm net flow to the RCS with the water level maintained within the range of > 10 ft and < 15 ft from the bottom of the cask loading pit.</u>

Testing was performed as documented in Reference 5 to verify that when tested individually, each RNS pump provides at least 1100 gpm net flow to the RCS with the water level maintained within the range of > 10 ft. and < 15 ft. from the bottom of the cask loading pit (CLP).

The test was initiated by verifying the CLP water level was > 10 ft to < 15.0 ft above the bottom of the CLP, RCS was depressurized, lower internals installed in the reactor vessel, and temporary flow and pressure gauges were installed and connected to a DAQ. The RNS system was aligned to take suction from the CLP and discharge back to the DVI lines. The A RNS pump was started, RNS injection flow was increased to maximum, flow was measured and verified to meet acceptance criteria. This testing was repeated using the B RNS pump.

The Unit 4 RNS pump A provided 2113 gpm and Unit 4 RNS pump B provided 1923 gpm. This verifies that for Unit 4 when tested individually, each RNS pump provided at least 1100 gpm net flow to the RCS with the water level maintained within the range of > 10 ft and < 15 ft from the bottom of the cask loading pit.

<u>Two operating RNS pumps provide at least 2000 gpm to the IRWST.</u>

Testing was performed as documented in Reference 6 to verify that two RNS pumps provide at least 2000 gpm to the In-containment Refueling Water Storage Tank (IRWST) which demonstrates the RNS will provide heat removal from the IRWST.

The test was initiated by verifying the IRWST level, temporary flow, and pressure instruments were installed and connected to the DAQ. The RNS system was aligned to recirculate the IRWST. Both RNS pumps were started, flow was established to the IRWST through each RNS heat exchanger and flow was measured and recorded.

The Unit 4 RNS pumps provided 2810 gpm. This demonstrates two operating RNS pumps on Unit 4 provide at least 2000 gpm to the IRWST.

<u>iii) Each motor-operated valve changes position as indicated in Table 2.3.6-1 under preoperational test conditions.</u>

Testing was performed as documented in Reference 7 and Reference 8 to confirm the Motor-Operated Valves (MOVs) listed in COL Appendix C Table 2.3.6-1 (Attachment A) change position under pre-operational flow, differential pressure, and temperature conditions.

Procedures listed in Reference 7 established the preoperational test conditions by ensuring the RCS was in a mid-loop level condition and the IRWST was filled to greater than 25% level. These conditions establish the greatest differential pressure and flow conditions for RNS-PL-V023 (RNS Suction from IRWST Motor-operated Isolation Valve). The RNS suction was aligned to the RCS, RNS-PL-V023 was opened, RCS level was verified to increase, then RNS-PL-V023 was closed. This demonstrated that this MOV changes position as indicated in Attachment A under preoperational test conditions.

Procedures listed in Reference 8 established preoperational test conditions by ensuring the RCS temperature was > 275ºF and RCS pressure was between 370 psig and 400 psig, with both trains of RNS in service. A manual actuation of RNS isolation was performed and RNS-PL-V011 (RNS Discharge MOV Containment Isolation), RNS-PL-V022 (RNS Suction Header MOV Containment Isolation), and the RNS suction header MOVs (RNS-PL-V001A, V001B, V002A, and V002B) were verified to close.

The test results confirm that each motor-operated valve, on Unit 4, changed position as indicated in Table 2.3.6-1 under preoperational test conditions.

iv) Each check valve changes position as indicated in Table 2.3.6-1.

Testing was performed as documented in Reference 9 to confirm that each check valve with an active safety function changes position as indicated in COL Table 2.3.6-1 (Attachment B) under pre-operational test pressure, temperature, and fluid flow conditions.

Procedures listed in Reference 9 established the preoperational test conditions by ensuring that RNS was filled and vented, and the RCS was available to receive water. Check valve RNS-PL-V003A was tested by isolating the downstream piping and using an available water connection to direct water through the valve to the RCS to demonstrate valve opening and then isolating the water and opening a system vent connection. The head of water upstream of the check valve closed the valve and closure was verified by non-intrusive test equipment installed on the check valve. This testing was repeated for RNS-PL-V003B. These conditions established the differential pressure and flow conditions for testing the RCS Pressure Boundary Thermal Relief Check Valves (RNS-PL-V003A/B).

Procedures listed in Reference 9 established the preoperational test conditions by ensuring the RCS is between 73.5% and 86.5% hot leg level, installed temporary flow instruments on each DVI line and aligned the RNS system for dual RNS pump recirculation of the RCS. Both RNS pumps were placed in service recirculating the RCS and flow readings were taken on the DVI line flow instruments. Check valves RNS-PL-V013, -V015A, -V015B -V017A, -V017B were verified to open based on the flow verification.

Testing was performed as documented in reference 9 to confirm that check valves RNS-PL-V015A, -V015B, V017A, -V017B closed. This testing was performed with one train of RNS in service for Shutdown Cooling. Each check valve was tested utilizing system pressure and fluid to seat the check valves and verify acceptable leakage. Check valve RNS-PL-V013 (RNS Discharge Header Containment Isolation Check Valve) was tested by isolating the valve, draining the fluid from both sides and utilized test connections to pressurize the upstream side with air and verified no leakage past the check valve.

This testing ensured each check valve on Unit 4 changed position as indicated in Table 2.3.6-1.

References 1 through 9 are available for NRC inspection as part of Unit 4 ITAAC Completion Package (Reference 10).

ITAAC Finding Review

In accordance with plant procedures for ITAAC completion, Southern Nuclear Operating Company (SNC) performed a review of all findings pertaining to the subject ITAAC and associated corrective actions. This review found there are no relevant ITAAC findings associated with this ITAAC. The ITAAC completion review is documented in the ITAAC Completion Package for ITAAC 2.3.06.09b.ii (Reference 10) and is available for NRC review.

ITAAC Completion Statement

Based on the above information, SNC hereby notifies the NRC that ITAAC 2.3.06.09b.ii was performed for VEGP Unit 4 and that the prescribed acceptance criteria were met.

Systems, structures, and components verified as part of this ITAAC are being maintained in their as-designed, ITAAC compliant condition in accordance with approved plant programs and procedures.

References (available for NRC inspection)

1. SV4-RNS-ITR-800375, Rev. 0, “Unit 4 Recorded Results of RNS Pump Flow with Hot Leg Water Level at 15.5 inches ± 2 inches: ITAAC 2.3.06.09b.ii Item 9b.ii NRC Index Number: 375”
2. Unit 4 Inspection Report, SV4-RCS-FSK-800376, Rev. 1, “Vogtle Unit 4 RCS Hot and Cold Leg As-Built Centerline Elevations”
3. Unit 4 Inspection Report, SV4-RNS-ITR-800377, Rev. 0, “Unit 4: ITAAC 375 Walkdown 2.3.06.09b.ii NRC Index Number 375”
4. Unit 4 Material Receiving Report, 26139-MRR-19-09166, Rev. 0,
5. SV4-RNS-ITR-801375, Rev. 0, “Unit 4 Recorded Results of RNS Pump Flow with Cask Loading Pit at > 10 ft and < 15 ft: ITAAC 2.3.06.09b.ii Item 9c NRC Index Number: 375”
6. SV4-RNS-ITR-802375, Rev. 0, “Unit 4 Recorded Results of Two RNS Pumps Flow To the In-Containment Refueling Water Storage Tank (IRWST): ITAAC 2.3.06.09b.ii Item 9d NRC Index Number: 375”
7. SV4-RNS-ITR-803375, Rev. 0, “Unit 4 Recorded Results of RNS Motor-Operated Valves Change Position as Indicated in Table 2.3.6-1: ITAAC 2.3.06.09b.ii Item 12a.iii NRC Index Number: 375”
8. SV4-RNS-ITR-804375, Rev. 0, “Unit 4 Recorded Results of RNS Motor-Operated Valves Change Position as Indicated in Table 2.3.6-1: ITAAC 2.3.06.09b.ii Item 12a.iii NRC Index Number: 375”
9. SV4-RNS-ITR-805375, Rev. 0, “Unit 4 Recorded Results of RNS Check Valves Change Position as Indicated in Table 2.3.6-1: ITAAC 2.3.06.09b.ii Item 12.a)iv NRC Index Number: 375“
10. 2.3.06.09b.ii-U4-CP-Rev0, ITAAC Completion Package

Attachment A

*Excerpt from COL Appendix C Table 2.3.6-1

*Equipment Name	*Tag No.	*Active Function
RCS Inner Hot Leg Suction Motor-operated Isolation Valve	RNS-PL-V001A	Transfer Closed
RCS Inner Hot Leg Suction Motor-operated Isolation Valve	RNS-PL-V001B	Transfer Closed
RCS Outer Hot Leg Suction Motor-operated Isolation Valve	RNS-PL-V002A	Transfer Closed
RCS Outer Hot Leg Suction Motor-operated Isolation Valve	RNS-PL-V002B	Transfer Closed
RNS Discharge Motor-operated Containment Isolation Valve	RNS-PL-V011	Transfer Closed
RNS Suction Header Motor-operated Containment Isolation Valve	RNS-PL-V022	Transfer Closed
RNS Suction from IRWST Motor-operated Isolation Valve	RNS-PL-V023	Transfer Closed

Attachment B

*Excerpt from COL Appendix C Table 2.3.6-1

*Equipment Name	*Tag No.	*Active Function
RCS Pressure Boundary Thermal Relief Check Valve	RNS-PL-V003A	Transfer Open/ Transfer Closed
RCS Pressure Boundary Thermal Relief Check Valve	RNS-PL-V003B	Transfer Open/ Transfer Closed
RNS Discharge Header Containment Isolation Check Valve	RNS-PL-V0013	Transfer Open/ Transfer Closed
RNS Discharge RCS Pressure Boundary Check Valve	RNS-PL-V015A	Transfer Open/ Transfer Closed
RNS Discharge RCS Pressure Boundary Check Valve	RNS-PL-V015B	Transfer Open/ Transfer Closed
RNS Discharge RCS Pressure Boundary Check Valve	RNS-PL-V017A	Transfer Open/ Transfer Closed
RNS Discharge RCS Pressure Boundary Check Valve	RNS-PL-V017B	Transfer Open/ Transfer Closed